REVISIONS							
ZONE	REV	DESCRIPTION	DATE	DWN	CHKR	ENGR	APVD
	1	REVISED PARTS NOTE: 174-300097-029 WAS -023, 337-300443-009 WAS -008	2/24/2003	JPT	SWH	MLJ	LTA
SHT#1	2	CHANGED THE MOUNTING CONTROL TO READ 4120; ECN 12765	2/8/2005	BJL	LTA	SWH	SUN
SHT#1	3	ADDED NOTE TO CLOSE MANUAL DRAIN VALVE	2/8/2005	DAP		DAP	
	4	ADDED NOTE TO CLOSE MANUAL DRAIN VALVE	7/19/07	EAZ	DAP	EAZ	DAP

INSTALLATION INSTRUCTIONS

THE AUTO FLUSH AND DRAIN KIT IS DESIGNED TO TURN THE BOILER ON AND OFF AT PREDETURMINED TIME INTERVALS BY ADJUSTING THE CLOCK THAT IS MOUNTED ON THE ENCLOSURE.

THE AUTO FLUSH AND DRAIN KIT IS DESIGNED TO AUTOMATICALLY DRAIN AND FLUSH A BOILER EACH TIME THE BOILER IS TURNED ON AFTER A SUFFICIENT COOL DOWN PERIOD. THE KIT HAS BUILT IN SAFE GUARDS TO PREVENT FLUIDS AT TEMPERATURES ABOVE 140 DEGREES F TO DISCHARGE DOWN THE DRAIN.
WHEN TEMPERATURE CONTROL IS SET FOR 140°F.
THE USE OF THE FLUSH AND DRAIN KIT WILL HELP MAINTAIN THE PROPER WATER CHEMISTRY IN YOUR BOILER TO PROVIDE TROUBLE FREE OPERATION.

REFER TO SHEET THREE OF THREE FOR DETAILED MODE OF OPERATION SEQUENCE.

REFER TO SHEET TWO OF THREE FOR CLOCK OPERATING INSTRUCTIONS.

ALWAYS REMOVE POWER AND CLOSE MANUAL DRAIN VALVE BEFORE MAKING CHANGES TO ANY CONTROL SETTING TO AVOID ANY UNEXPECTED OPERATION.

PARTS

PARTS INCLUDED IN FLUSH AND DRAIN "B MOD" KIT P/N 174-300097-029 W/ 337-300443-009 WIRING
NOTE: DEPENDING ON YOUR BOILER, NOT ALL PARTS SUPPLIED IN KIT MAY BE USED.

ITEM #	QTY	DESCRIPTION
(16)	4	10-32 SCREW X 3/4"
(17)	4	10-32 NUT
(18)	8	#10 FLAT WASHER
(19)	4	#10 SPLIT WASHER
(20)	1	WIRE NUT
(21)	3	QUICK CONNECT TERM.
(22)	2	DUAL SPADE CONNECTER
(23)	4	SPADE CONNECTER
(24)	1	1/2X3/8 REDUCER
(25)	1	3/4 X 3/8" REDUCER
(11)	1	CONTROL ENCLOSURE
(26)	1	INSTRUCTIONS
	1	PIPING ASSEMBLY

ELECTRICAL WIRING

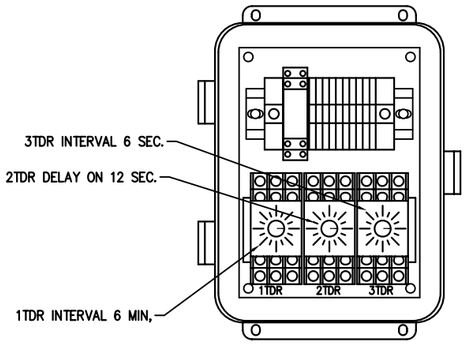
DUE TO VARIABLES IN BOILER DESIGN, THERE ARE VARIOUS BOILER WIRING CONFIGURATIONS THAT COULD BE ENCOUNTERED IN THE FIELD. THE FIRST STEP IS TO EVALUATE WHICH CONTROL WIRING CONFIGURATION YOU HAVE AND PROCEED TO THE APPLICABLE DRAWING AND INSTRUCTIONS.

1. IF YOUR WATER LEVEL CONTROL IS A CHROMALOX P/N 323-300033-035 REFER TO ILLUSTRATION #1 (SHEET 2).

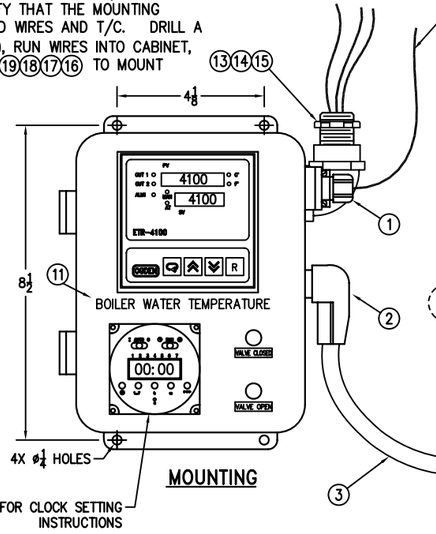
2. IF YOUR WATER LEVEL CONTROL IS A CURTIS CONTROL BOARD OR A WARRICK CONTROL BOARD REFER TO ILLUSTRATION #2 (SHEET 3).

ELECTRICAL ENCLOSURE MOUNTING

FIND A SUITABLE MOUNTING LOCATION TO MOUNT THE ELECTRICAL ENCLOSURE. GENERALLY THE SAME SIDE AS THE ON/OFF SWITCH IS ADEQUATE. BOLT MOUNTING PATTERN WILL BE 8 1/2" X 4 1/8" WITH A HOLE DIAMETER OF 1/4" (REF TO MOUNTING SKETCH). DRILL 1/4" HOLES IN MOUNTING LOCATIONS. VERIFY THAT THE MOUNTING LOCATION IS WITHIN REACH OF CONDUIT LEAD WIRES AND T/C. DRILL A HOLE FOR A 1/2" CONDUIT OPENING (ø7/8"), RUN WIRES INTO CABINET, AND MOUNT CONDUIT FITTING. USE ITEMS (19)(18)(17)(16) TO MOUNT ENCLOSURE.



VIEW WITH COVER REMOVED



MOUNTING

SEE PAGE TWO FOR CLOCK SETTING INSTRUCTIONS

PIPING

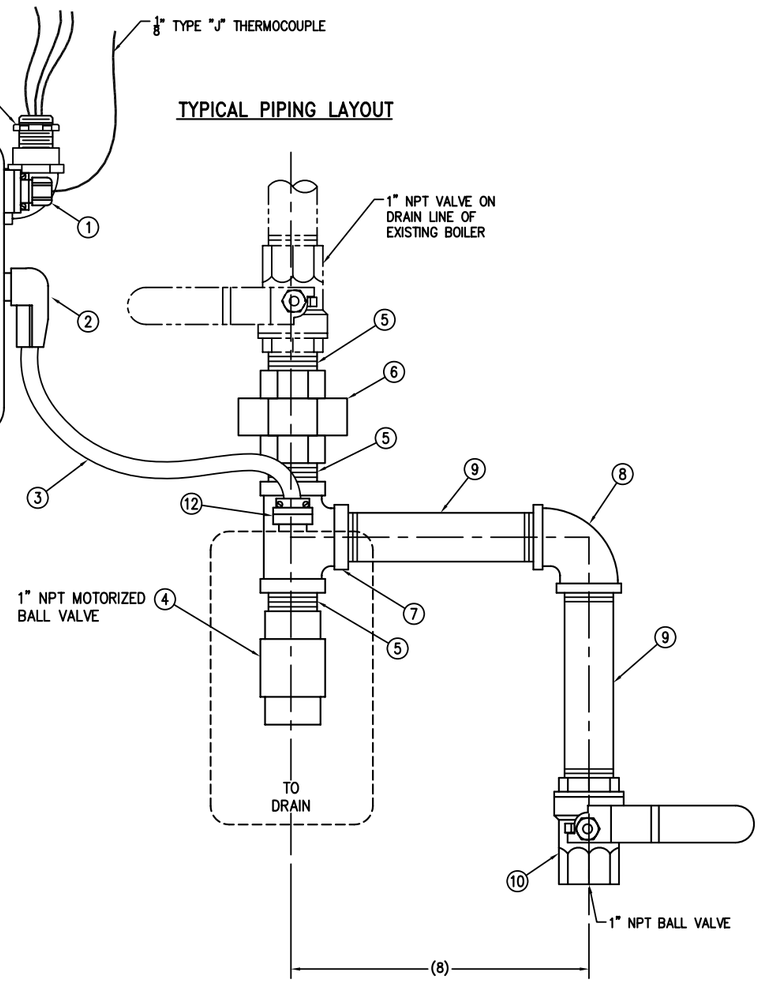
INSTALL THE PIPING ASSEMBLY INTO THE ORIGINAL 1" NPT VALVE THAT WAS SUPPLIED WITH THE BOILER. CARE SHOULD BE TAKEN NOT TO DISTURB THE THREADED CONNECTIONS BETWEEN THE BOILER DRAIN VALVE AND THE BOILER. LOOSEN THE UNION SUPPLIED WITH THE PIPING ASSEMBLY AND ASSEMBLE THE 1" NPT NIPPLE INTO THE 1" NPT VALVE (REFER TO TYPICAL PIPING LAYOUT). TIGHTEN UP UNION AND PLUMB TWO 1" NPT DRAIN LINES FROM DRAIN AND FLUSH TO BUILDING DRAIN. PLEASE NOTE THE AUTO FLUSH AND DRAIN "B MOD" IS FACTORY SET TO DISCHARGE WATER AT A TEMPERATURE OF 140 DEGREES F OR LESS. PLEASE VERIFY THAT THESE DISCHARGE TEMPERATURES COMPLY WITH THE BUILDING DRAIN SYSTEM AND LOCAL CODES. DO NOT ALTER THE DISCHARGE TEMPERATURE SETTING WITHOUT REFERRING TO LOCAL CODES AND BUILDING DRAIN SYSTEM CAPACITY.

MOST BOILERS WILL HAVE A WELDED SIDE ARM ASSEMBLY MOUNTED TO THE SIDE WITH A WATER GAGE GLASS ATTACHED. INSTALL THE 1/8" THERMOCOUPLE (T/C) PROVIDED WITH THE D+F KIT INTO THE 3/8" COUPLING LOCATED ABOUT TWO TO THREE INCHES UP FROM THE BOTTOM OF THE WELDED SIDE ARM ASSEMBLY (IF THE COUPLING IS A 1/2" NPT, INSTALL THE 1/2 X 3/8 REDUCER SUPPLIED IN THE D+F KIT FIRST). THIS 3/8" COUPLING WILL BE IN LINE WITH A 1" PIPE WHICH LEADS INTO THE BOILER. INSERT THE T/C UNTIL THE TIP IS INSIDE THE BOILER. MANY TIMES THE T/C TIP WILL HIT AN INTERNAL PART OF THE BOILER. THIS WILL BE A GOOD INDICATION THAT THE TIP OF T/C IS INSIDE THE BOILER. SLIDE THE 3/8" COMPRESSION FITTING NEAR THE 3/8" COUPLING AND TIGHTEN THE HALF OF THE COMPRESSION FITTING CLOSEST TO THE BOILER FIRST. THEN TIGHTEN THE SECOND HALF OF THE COMPRESSION FITTING.

IF THE BOILER DOES NOT HAVE A WELDED SIDE ARM ASSEMBLY THE T/C MAY BE INSTALLED IN AN AVAILABLE PORT IN THE VESSEL WALL. MOST VESSELS WITHOUT A WELDED SIDE ARM ASSEMBLY WILL HAVE AN EXTRA 3/4" NPT PORT IN THE LOWER END OF THE BOILER. THIS PORT IS GENERALLY FOUND AT THE REAR OF THE BOILER. WHEN USING A 3/4" NPT ACCESS USE THE 3/4 X 3/8 REDUCER SUPPLIED. THEN INSERT THE T/C INSIDE THE BOILER AND INSTALL THE COMPRESSION FITTING AS PRESCRIBED ABOVE. THE T/C IS SHOULD BE OPERATING IN THE WATER. VERIFY THAT THE T/C IS UNDER THE WATER AND INSIDE THE BOILER.

CAUTION:
IMPROPER LOCATION OF T/C CAN CAUSE DISCHARGE OF HOT WATER OR STEAM TO DRAIN. VERIFY TEMPERATURE CONTROL IS INDICATING PROPER TEMPERATURE IN THE BOILER DURING OPERATION.

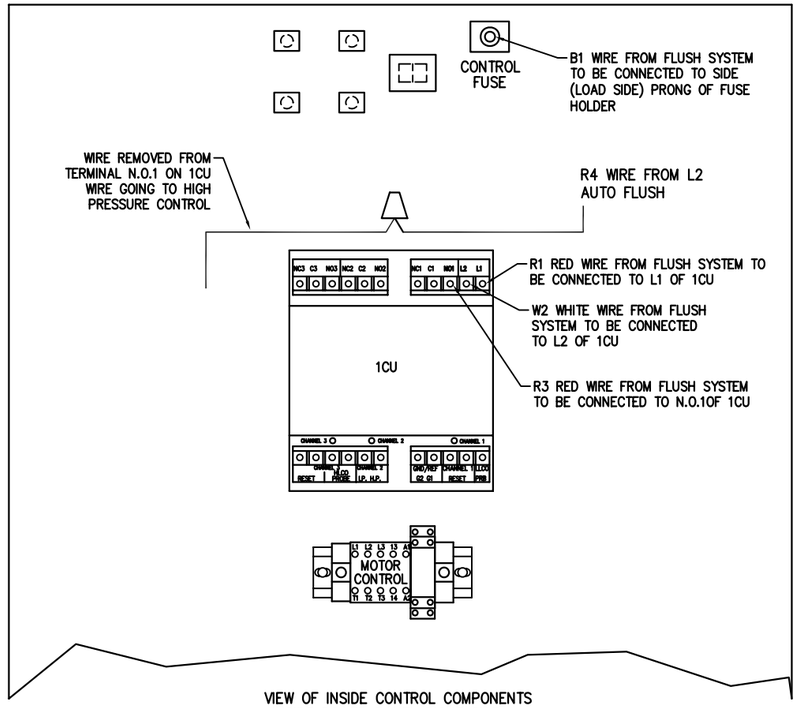
TYPICAL PIPING LAYOUT



UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS ±1/32 DECIMALS .XX ±0.01 .XXX ±0.005 ANGLES ±2°	CONTRACT NO	Chromalox® PRECISION HEAT AND CONTROL	Ogden, Utah 84404 www.chromalox.com
	USED ON	LAYOUT AUTO FLUSH AND DRAIN "B MOD"- CES 25/180	
MATERIALS	APPROVALS / DATE		
	DWN ALT 10/28/2002		
FINISH	CHKR RCJ 10/30/2002		
	ENGR SWH 10/30/2002		
THIS DRAWING AND THE SUBJECT MATTER SHOWN HEREON IS CONSIDERED CONFIDENTIAL AND MAY BE PROPRIETARY. UNAUTHORIZED DISCLOSURE TO OTHER PARTIES IS EXPRESSLY FORBIDDEN.	APVD LTA 10/30/2002	SIZE D / CODE IDENT NO 07131 / DRAWING NO 174-300097-029 / REV 4	
	DWO - CO# -		
	CAD NO	SCALE HALF	DO NOT SCALE DRAWING / SHEET 1 OF 3

REVISIONS							
ZONE	REV	DESCRIPTION	DATE	DWN	CHKR	ENGR	APVD
		SEE SHEET 1 FOR REVISION					

ILLUSTRATION #1


CONTROL FUSE
B1 WIRE FROM FLUSH SYSTEM TO BE CONNECTED TO SIDE (LOAD SIDE) PRONG OF FUSE HOLDER
WIRE REMOVED FROM TERMINAL N.O.1 ON 1CU WIRE GOING TO HIGH PRESSURE CONTROL
R4 WIRE FROM L2 AUTO FLUSH
R1 RED WIRE FROM FLUSH SYSTEM TO BE CONNECTED TO L1 OF 1CU
W2 WHITE WIRE FROM FLUSH SYSTEM TO BE CONNECTED TO L2 OF 1CU
1CU
R3 RED WIRE FROM FLUSH SYSTEM TO BE CONNECTED TO N.O.10F 1CU
MOTOR CONTROL

VIEW OF INSIDE CONTROL COMPONENTS INSIDE BOILER PANEL RIGHT SIDE

REFER TO SHEET THREE OF THREE FOR DETAILED MODE OF OPERATION

ILLUSTRATION #1

CONTROL CIRCUIT USING CHROMALOX LEVEL CONTROL BOARD

FIVE CONNECTIONS ARE REQUIRED FROM THE DRAIN AND FLUSH CONTROL BOX TO THE BOILER ENCLOSURE. THE FIVE CONNECTIONS CONSIST OF THE FOLLOWING:

1. SWITCHED HOT 120V POWER.
2. UNSWITCHED HOT 120V POWER.
3. NEUTRAL 120V POWER.
4&5. WIRES TO BREAK POWER TO THE BOILER HEATER.

SWITCHED HOT POWER. THIS WIRE IS IDENTIFIED AS "R1" ON THE F+D (FLUSH AND DRAIN KIT). THIS WIRE MAY BE ATTACHED TO THE BOILER AT MANY LOCATIONS. THE FOLLOWING ARE SOME OPTIONS:

OPTION #1
THE WIRE MAY BE ATTACHED TO THE CHROMALOX LEVEL CONTROL BOARD AT THE TERMINAL MARKED "L1". IF THERE ARE ALREADY TWO WIRES ON THIS CONNECTION, REFER TO THE NEXT OPTION.

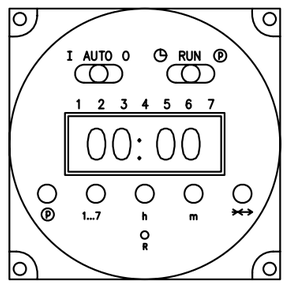
OPTION #2
THE "R1" WIRE FROM THE D+F KIT MAY BE ATTACHED TO THE BOILER ON/OFF SWITCH. THIS WIRE CONNECTION TO THE SWITCH WILL BE THE SAME WIRE NUMBER AS THE "L1" TERMINAL ON THE CHROMALOX LEVEL CONTROL BOARD. AS A GENERAL RULE THIS WILL BE LABELED AS "#4". IN ALL CASES THIS CONNECTION WILL BE ON THE LOWER LEFT HAND TERMINAL (VIEWING FROM THE REAR) OF THE ON/OFF SWITCH (TERMINAL MARKED #3 ON THE ON/OFF SWITCH). (REFER TO SKETCH IN UPPER LEFT HAND CORNER OF SHEET 3 OF 3). TO ATTACH THE "R1" WIRE TO THIS TERMINAL YOU WILL HAVE TO ADD A QUICK CONNECT TERMINAL TO THE WIRE AND ADD A DUAL SPADE CONNECTOR TO TERMINAL #3 OF THE ON/OFF SWITCH.

UNSWITCHED HOT POWER. THE WIRE LABELED "B1" FROM THE D+F KIT WILL BE ATTACHED TO THE SIDE (LOAD SIDE) PRONG OF THE 120V FUSE HOLDER WHICH ISLOCATED NEXT TO THE ON/OFF SWITCH. ADD A DUAL SPADE CONNECTOR AND A QUICK CONNECT TERMINAL IF REQUIRED.

NEUTRAL POWER. THIS WIRE WILL BE LABELED "W2" FROM THE D+F KIT. ATTACH THIS WIRE TO THE "L2" TERMINAL OF THE CHROMALOX LEVEL CONTROL BOARD. IF TWO WIRES ARE ALREADY THERE, ATTACH TO THE NEUTRAL SIDE OF THE INCOMING POWER USING A SPADE CONNECTOR. ONLY ATTACH TO THE NEUTRAL SIDE OF THE 120V POWER SUPPLY.

HEATER DISCONNECT WIRES. THE THIRD TERMINAL FROM THE TOP RIGHT OF THE CHROMALOX LEVEL CONTROL BOARD IS "NO1". DISCONNECT THIS WIRE AND ATTACH TO "R4" FROM THE D+F KIT USING A WIRE NUT. CONNECT WIRE "R3" FROM THE D+F KIT TO TERMINAL "NO1" OF THE CHROMALOX LEVEL CONTROL BOARD.

CLOCK SETTING INSTRUCTIONS	
SET TIME AND DAY	SLIDE SET SWITCH TO ◷. PRESS 1..7 BUTTON UNTIL ARROW POINTS TO CORRECT DAY (1 = MONDAY). PRESS h THEN m BUTTONS TO SET CORRECT TIME. PM INDICATOR (P) SHOWS NOON TO 11:59 P.M. SLIDE SET SWITCH TO RUN. CLOCK COLON WILL BLINK.
SET SWITCH ON CYCLE	SLIDE SET SWITCH TO P. A "1" INDICATES THE FIRST SWITCH CYCLE AND A "BULB" INDICATES A SWITCH-ON (CIRCUIT CLOSES). PRESS 1..7 BUTTON UNTIL ARROWS POINT TO SELECTED DAY(S) FOR THIS CYCLE. PRESS h AND m BUTTONS TO SHOW SWITCH-ON TIME, NOTING PM INDICATOR.
SET SWITCH OFF CYCLE	WITH SET SWITCH AT P, PRESS Ⓟ BUTTON, NOTE SWITCH CYCLE NUMBER CHANGES TO 2 AND BULB BLANKS, INDICATING SWITCH-OFF (CIRCUIT OPENS). PRESS 1..7 BUTTON TO MATCH DAY(S) SET FOR SWITCH CYCLE "1". PRESS h AND m BUTTONS TO SELECT SWITCH-OFF TIME. REPEAT STEPS UP TO 9 ON/OFF EVENTS. SLIDE SET SWITCH TO RUN. CLOCK COLON WILL BLINK.
AUTORUN RUN MODE	SET TIME, DAY AND DESIRED SWITCH CYCLES. SLIDE SET SWITCH TO RUN AND MODE SWITCH TO AUTO. SWITCHING BEGINS WITH NEXT SWITCH-ONSET TIME.
OVERRIDE ON	SLIDE MODE SWITCH TO I. SWITCH REMAINS ON INDEFINITELY (CIRCUIT CLOSED).
OVERRIDE OFF	SLIDE MODE SWITCH TO O. SWITCH REMAINS OFF INDEFINITELY (CIRCUIT OPEN).
SKIP CYCLE	IN AUTOMATIC RUN MODE PRESS ⤑ BUTTON. THE NEXT CALENDAR DAY IS SKIPPED.
SETTING ERROR	IF EEE APPEARS, A SETTING ERROR EXISTS. THE SWITCH CYCLE NUMBER IN ERROR IS SHOWN. SLIDE SET SWITCH TO P PRESS Ⓟ BUTTON UNTIL CYCLE IS SHOWN. REVIEW THIS AND FOLLOWING SETTING TO CORRECT ERROR. SLIDE SET SWITCH TO RUN.
CLEAR ANY SETTING	SLIDE SET SWITCH TO P. PRESS Ⓟ BUTTON TO SHOW SWITCH CYCLE TO CLEAR. PRESS 1..7 BUTTON UNTIL NO DAYS ARE INDICATED. REPEAT FOR FOLLOWING SWITCH CYCLE. THIS ON/OFF CYCLE IS NOW INACTIVE.
CLEAR ALL	TO RELEASE ALL SETTINGS, PRESS R.



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TOLERANCES ARE:
FRACTIONS ±1/32 DECIMALS .XX ±0.01 .XXX ±0.005 ANGLES ±2°

MATERIALS

FINISH

THIS DRAWING AND THE SUBJECT MATTER SHOWN HEREON IS CONSIDERED CONFIDENTIAL AND MAY BE PROPRIETARY. UN-AUTHORIZED DISCLOSURE TO OTHER PARTIES IS EXPRESSLY FORBIDDEN.

CONTRACT NO

USED ON

APPROVALS		DATE
DWN	ALT	10/28/2002
CHKR	RCJ	10/30/2002
ENGR	SWH	10/30/2002
APVD	LTA	10/30/2002
DWO –		CO# –

CAD NO

Chromalox® PRECISION HEAT AND CONTROL
Ogden, Utah 84404
www.chromalox.com

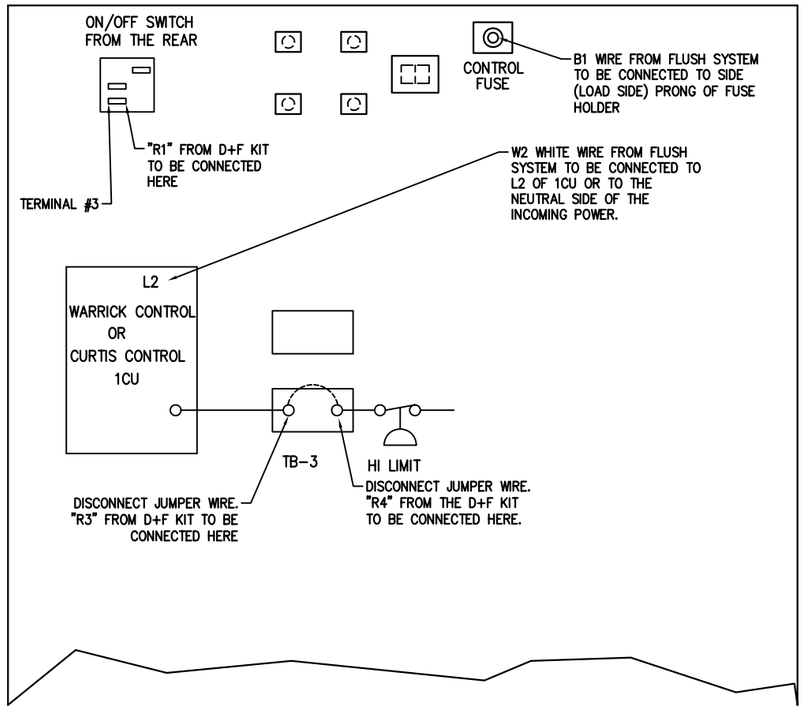
LAYOUT
AUTO FLUSH AND DRAIN "B MOD"– CES 25/180

SIZE	CODE IDENT NO	DRAWING NO	REV
D	07131	174-300097-029	4

SCALE HALF | DO NOT SCALE DRAWING | SHEET 2 OF 3

REVISIONS							
ZONE	REV	DESCRIPTION	DATE	DWN	CHKR	ENGR	APVD
		SEE SHEET 1 FOR REVISION					

ILLUSTRATION #2



REFER TO SHEET TWO OF THREE FOR CLOCK SETTING INSTRUTIONS

ILLUSTRATION #2

CONTROL CIRCUIT USING CURTIS OR WARRICK

LEVEL CONTROL BOARD.

FIVE CONNECTIONS ARE REQUIRED FROM THE DRAIN AND FLUSH CONTROL BOX TO THE BOILER ENCLOSURE. THE FIVE CONNECTIONS CONSIST OF THE FOLLOWING:

1. SWITCHED HOT 120V POWER.
2. UNSWITCHED HOT 120V POWER.
3. NEUTRAL 120V POWER.

4+5. WIRES TO BREAK POWER TO THE BOILER HEATER.

SWITCHED HOT POWER. THIS WIRE IS IDENTIFIED AS "R1" ON THE F+D (FLUSH AND DRAIN KIT). THIS WIRE MAY BE ATTACHED TO THE BOILER AT THE FOLLOWING LOCATIONS:

A. THE "R1" WIRE FROM THE D+F KIT MAY BE ATTACHED TO THE BOILER ON/OFF SWITCH. THIS WIRE CONNECTION WILL GENERALLY BE "R4" ON THE BOILER. IN ALL CASES THIS CONNECTION WILL BE ON THE LOWER LEFT HAND TERMINAL (VIEWING FROM THE REAR) OF THE ON/OFF SWITCH (MARKED TERMINAL#3 ON THE ON/OFF SWITCH). TO ATTACH THE "R1" WIRE TO THIS TERMINAL YOU WILL HAVE TO ADD A QUICK CONNECT TERMINAL TO THE WIRE AND ADD A DUEL SPADE CONNECTOR TO TERMINAL #3 OF THE ON/OFF SWITCH.

B. YOU MAY AS AN OPTION CONNECT THE "R1" WIRE FROM THE D+F KIT TO THE "2CR" RELAY ON THE BOILER AT THE SAME PLACE THE "R4" BOILER WIRE ENTERS THE RELAY, AT TERMINAL #4.

UNSWITCHED HOT POWER. THE WIRE LABELED "B1" FROM THE D+F KIT WILL BE ATTACHED TO THE SIDE (LOAD SIDE) PRONG OF THE 120V FUSE HOLDER WHICH IS LOCATED NEXT TO THE ON/OFF SWITCH. ADD A DUEL SPADE CONNECTOR AND A QUICK CONNECT TERMINAL IF REQUIRED.

NEUTRAL POWER. THIS WIRE WILL BE LABELED "W2" FROM THE D+F KIT. ATTACH THIS WIRE TO THE "L2" TERMINAL OF THE LEVEL CONTROL BOARD. ADD A QUICK CONNECT TERMINAL AND DUAL SPADE CONNECTOR IF REQUIRED. AS AN OPTION YOU MAY ATTACH TO THE NEUTRAL SIDE OF THE INCOMING POWER USING A SPADE CONNECTOR. ONLY ATTACH TO THE NEUTRAL SIDE OF THE 120V POWER SUPPLY.

HEATER DISCONNECT WIRES. THE BOILER CONTROL CIRCUIT WILL HAVE A TERMINAL BLOCK BETWEEN THE HEATER OUTPUT TERMINAL (OF THE LEVEL CONTROL) AND THE BOILER "HI LIMIT" CONTROL. TYPICALLY THIS WIRE NUMBER AT THIS TERMINAL BLOCK WILL BE "R9". THE TERMINAL BLOCK HAS 4 TERMINALS ON IT . THEY ARE JUMPERED IN TWO PLACES. DISCONNECT THE JUMPER WHICH IS BETWEEN THE HEATER OUTPUT TERMINAL AND THE HI PRESSURE CONTROL (REFER TO ORIGINAL WIRING DIAGRAM FOR WIRE NUMBER VERIFICATION). CONNECT WIRES "R3" AND "R4" (FROM THE D+F KIT) TO THE BOILER TERMINAL BLOCK WHERE THE JUMPER WIRE WAS REMOVED. USE SPADE CONNECTORS IF REQUIRED.

MODE OF OPERATION

FOR AUTO FLUSH SYSTEM

1. BOILER IS TURNED ON, EITHER BY POWER AT BREAKER BOX OR WITH THE ON/OFF SWITCH.

2. POWER IS APPLIED TO THE 12 SECOND DELAY ON 2TDR COIL. POWER IS ALSO APPLIED TO CONTROL ETR-4100. 2TDR HAS A 12 SECOND DELAY ALLOWING CONTROL TO STABILIZE BEFORE THE CONTACTS ON CONTROL ETR-4100 WILL ACTIVATE.

3. AS 2TDR COIL TIMES OUT, CONTACT 2TDR1 AND 2TDR2 WILL CLOSE. THE ACTION OF 2TDR1 WILL BE DISCUSSED FIRST.

   A. 2TDR1 CLOSES. THE COIL ON THE 6 MINUTE 1TDR INTERVAL RELAY IS ENERGIZED. THIS CLOSES 1TDR1, AND OPENS 1TDR2 AND 1TDR3. THESE WILL BE DISCUSSED IN ORDER.

      a. 1TDR1 CLOSES. IF THE SET POINT ON THE CONTROLLER ETR-4100 IS HIGHER THAN BOILER WATER TEMPERATURE, THE MOTORIZED BALL VALVE WILL OPEN. THE VALVE WILL REMAIN OPEN FOR 6 MINUTES OR CLOSE IF THE ON/OFF SWITCH IS DEACTIVATED. WHEN THE VALVE IS OPEN THE VALVE CLOSED LIGHT WILL TURN OFF AND THE VALVE OPEN LIGHT WILL ACTIVATE. IF THE SET POINT ON THE CONTROLLER ETR-4100 IS LOWER THAN BOILER WATER TEMPERATURE, THE BALL VALVE WILL NOT OPEN.

      b. 1TDR2 OPENS. THIS DEACTIVATES THE VALVE CLOSING CIRCUIT WHILE THE VALVE IS OPEN.

      c. 1TDR3 OPENS. THIS DEACTIVATES THE HEATER CIRCUIT WHILE THE FLUSH VALVE IS OPEN.

   B. 2TDR2 CLOSES. THIS ENERGIZES THE COIL ON THE 6 SECOND INTERVAL 3TDR. THE CLOSING OF 3TDR2 MAINTAINS POWER TO THE VALVE WHILE IT IS OPENING IN THE EVENT THE BOILER ON/OFF SWITCH IS TURNED OFF. IN THE EVENT OF POWER FAILURE DURING THE OPEN CYCLE OF THE VALVE, THE VALVE WILL REMAIN OPEN UNTIL POWER IS RESTORED. THE VALVE WILL THEN COMPLETE THE OPEN CYCLE AFTER A 7 SECOND DELAY. THE FUNCTION OF 3TDR1 CLOSING PREVENTS A RELAY RACE WITH THE MOTORIZED BALL VALVE CONTACTS AND 3TDR WHICH CAUSES ERRATIC OPERATION.

4. AT THE END OF 6 MINUTES THE INTERVAL COIL 1TDR WILL TIME OUT AND OPEN 1TDR1 AND CLOSE 1TDR2 AND 1TDR3. THIS WILL DEACTIVATE POWER TO THE VALVE OPEN CIRCUIT. IT WILL ACTIVATE THE VALVE CLOSE CIRCUIT AND THE HEATER CIRCUIT. THE VALVE OPEN LIGHT WILL DEACTIVATE AND THE VALVE CLOSED LIGHT WILL ACTIVATE.

5. THE AUTO FLUSH SYSTEM WILL REMAIN IN THE VALVE CLOSED MODE UNTIL POWER IS REMOVED. FLUSHING VALVE WILL ONLY ACTIVATE IF TEMPERATURE SET POINT IS ABOVE BOILER WATER TEMPERATURE.

6. IF FLUSH BALL VALVE IS OPEN IT MAY BE CLOSED AT ANY TIME BY DEACTIVATING THE BOILER ON/OFF SWITCH.

7. IF BOILER IS TURNED OFF, THEN ON, WHILE BOILER TEMPERATURE IS ABOVE SET POINT OF THE CONTROLLER ETR-4120 THE VALVE WILL NOT OPEN. THERE WILL BE A 6 MINUTE DELAY BEFORE THE HEATER CIRCUIT IS ACTIVATED.

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS ±1/32 DECIMALS .XX ±0.01 .XXX ±0.005 ANGLES ±2°	CONTRACT NO	Chromalox® PRECISION HEAT AND CONTROL	Ogden, Utah 84404 www.chromalox.com
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	DWO - CO# -		
	CAD NO	SCALE HALF	DO NOT SCALE DRAWING / SHEET 3 OF 3